CLAIMS

1. A method of manufacturing a telescope mirror (21, 22) comprising the steps of:

(a) providing a mandrel (10) defining the geometry of the telescope mirror,

(b) depositing a reflective layer (26) on the mandrel surface,

(c) electroforming a mirror body (25) onto the reflective layer (26) by an electrochemical process,

(d) releasing the mirror body (25) with the reflective layer (26) from the mandrel (10),

wherein the electroforming process and the release process are controlled such that the building up of internal mechanical tension within the mirror body is suppressed.

2. The method according to claim 1, wherein the internal mechanical tension is measured during the electroforming process using an additional electroforming sample (18) which is electroformed in parallel and/or an electronic stress measurement device.

3. The method according to claim 1 further including the step of cleaning the mandrel (10) between the method steps (a) and (b).

4. The method according to claim 1, wherein the step of depositing the reflective layer (26) is carried out in a vacuum or electrochemical environment.

5. The method according to claim 1, wherein method step (d) is carried in clean room conditions.

6. The method according to claim 1, wherein the mirror body (25) is electroformed of Ni or Ni-alloy materials.

7. The method according to claim 1, wherein the electroforming step is carried out using an electrochemical liquid having a temperature of between 40 °C and 70 °C.

8. The method according to claim 1, wherein a supporting structure (23) is attached to the mirror body (25).

9. The method according to claim 8, wherein the supporting structure (23) is attached to the mirror body before releasing the latter from the mandrel.

10. The method according to claim 8, wherein the supporting structure (23) is attached to the mirror body after releasing the latter from the mandrel.

11. The method according to claim 8, wherein the supporting structure attaching step is carried out under temperature conditions similar to the operating temperature of the telescope mirror.

12. The method according to claim 1, wherein mandrels made of glass, zerodur, Polymetylmetacrylat (PMMA), composite material or metal are provided.

13. The method according to claim 1, wherein pure gold is used as material of the reflective layer (26) in method step (b).

14. A transceiver device (20) for high bandwidth free space optical data transmission comprising at least one reflector element (21, 22) having:

- a reflector body (25) formed by an electrochemical replication technique using a mandrel (10) defining the geometry of the reflector element, and
- a thin reflective layer (26) on the reflector body.

15. The transceiver according to claim 14, wherein the deviation of the reflector element from the design geometry is at any part of the reflector smaller than 50 μm, preferably smaller than 10 μm, more preferably smaller than 1 μm.

16. The transceiver according to claim 14, comprising a primary (21) and a secondary (22) mirror for concentrating an incoming electromagnetic wave into an optical fibre.

17. The transceiver according to claim 14, wherein the reflector element (21, 22) has a thickness in the range of 2 to 10 mm.

18. The transceiver according to claim 14, wherein the reflector element has a thickness of between 0,5 and 5 mm and being supported by a supporting structure (23).

19. The transceiver according to claim 14 wherein the reflector element has a thickness of between 10 μm and 500 μm and being supported by a supporting structure including actuators (23b) for adapting and correcting the geometry of the reflector element.

20. A telescope mirror (20) for high bandwidth free space optical data transmission comprising:

- a mirror body (25) formed by an electrochemical replication process using a mandrel (10) defining a geometry of telescope mirror,
- an optical reflective coating (26) on the mirror body.

21. The telescope mirror according to claim 20 further comprising a supporting structure (23) supporting said mirror body on the side opposite to the optical reflective coating, wherein the thermal expansion coefficient of said mirror body and said supporting structure are equal to one another within a deviation of 1%, preferably of 0.1%.

22. The telescope mirror according to claim 21, wherein the supporting structure is formed by an electroforming process.

23. The telescope mirror according to claim 21, wherein the material of the supporting structure is the same as the material of the mirror body.

24. The telescope mirror according to claim 20, wherein the supporting structure has a ring geometry (23a).

25. The telescope mirror according to claim 20, wherein the optical reflective coating consists of a thin high reflectivity metal film.

26. The use of reflector elements (21, 22) formed by an electrochemical replication technique using a mandrel (10) defining the geometry of the reflector element as optical mirrors for high bandwidth free space optical data transmission.

27. A method of high bandwidth free space optical data transmission from a transmitter station to a receiver station wherein at least one of the transmitter station and the receiver station comprises optical reflector elements (21, 22) formed by an electrochemical replication technique using a mandrel (10) which defines the geometry of the optical reflector element (21, 22).

28. The method according to claim 27, wherein the receiver station comprises optical reflector elements for concentrating a light beam having a diameter of between 10 and 100 cm into an optical fibre connection (31) having a diameter less than 150 μm with an efficiency of more than 80%, preferably more than 90%.

29. The method according to claim 27, wherein light having a wavelength of about 1550 nm is used for the data transmission.

30. The method according to claim 27, wherein the mandrel surface defines the surface smoothness of the reflective layer surface of the optical telescope.